

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

## PCT

To:

see form PCT/ISA/220

### WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/JP2004/012222

International filing date (day/month/year)  
19.08.2004

Priority date (day/month/year)  
20.08.2003

International Patent Classification (IPC) or both national classification and IPC  
C09K3/14, C01B21/064, C04B35/5831, B24D5/06

Applicant  
SHOWA DENKO K.K.

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

Name and mailing address of the ISA:



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WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITYInternational application No.  
PCT/JP2004/012222PCT/JP2004/012222  
FEB 2005**Box No. I Basis of the opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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**Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application,
- ☒ claims Nos. 5-16, 17(part), 18(part)

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☒ no international search report has been established for the whole application or for said claims Nos. 5-16, 17(part), 18(part)
- ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
  - the written form ☐ has not been furnished
  - ☐ does not comply with the standard
  - the computer readable form ☐ has not been furnished
  - ☐ does not comply with the standard
- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
- ☐ See separate sheet for further details

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**Box No. IV Lack of unity of invention**

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1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☐ paid additional fees.
  - ☐ paid additional fees under protest.
  - ☒ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
  - ☒ not complied with for the following reasons:  
**see separate sheet**
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
  - ☒ the parts relating to claims Nos. 1-4, 17(part), 18(part)

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	-
	No: Claims	1-4, 17, 18
Inventive step (IS)	Yes: Claims	-
	No: Claims	1-4, 17, 18
Industrial applicability (IA)	Yes: Claims	1-4, 17, 18
	No: Claims	-

2. Citations and explanations

**see separate sheet**

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**Box No. VI    Certain documents cited**

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1. Certain published documents (Rules 43*bis*.1 and 70.10)  
and / or
2. Non-written disclosures (Rules 43*bis*.1 and 70.9)  
**see form 210**

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/JP2004/012222

**Section III (subject-matter excluded from examination)**

1. A lack of unity objection was raised at the search stage (see reasoning in Section IV). However, an additional search fee was not paid. In accordance with R.66.1(e) PCT, examination was only carried out for the searched subject-matter (1st. invention).

**Section IV (unity of invention)**

2. This Authority considers that there are 2 inventions covered by the claims indicated as follows:
  - I: Claims 1-4, 17(part) and 18(part) directed to cubic boron nitride having a certain magnesium content, a grinding wheel comprising the same and a sintered compact comprising the same.
  - II: Claims 5-16, 17(part) and 18(part) directed to a method for producing cubic boron nitride using a catalyst substance which comprises a lithium source, a magnesium source and a carbon source, the product obtainable by the process, a grinding wheel comprising the product obtainable by the process and a sintered compact comprising the product obtainable by the process.

The reasons for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

The two groups are not linked by a special technical feature. The product of claim 1 is defined in terms of a particular magnesium content. The process according to claim 5 and the resulting product (claim 16) do not define a particular magnesium content of the end product. The main feature of claim 5 is the mixture of substances used a catalyst: lithium source plus magnesium source plus carbon source. The amount of magnesium relative to the other components of the catalyst is defined, but neither the amount of magnesium in the end product nor the relative amounts of hexagonal BN and catalyst substance are defined. The reaction conditions used, eg. temperature, pressure and duration, are also not defined in claim 5, so that the process according to claim 5 does not lead automatically to the product as defined in claim 1. The claims therefore lack unity in the sense of R.13.1

PCT.

**Section V (reasoned statement)**

**Group I: claims 1-4, 17(part) and 18(part)**

3. Reference is made to the following documents:

D1: US-A-5 332 629 (SUMIYA ET AL) 26 July 1994 (1994-07-26)

D2: EP-A-0 407 946 (SUMITOMO ELECTRIC INDUSTRIES, LIMITED; SUMITOMO ELECTRIC INDUSTRIES, L) 16 January 1991 (1991-01-16)

4. The subject-matter is not new in the sense of Article 33(2) PCT. The reasoning is as follows:

4.1 Document D1 (claim 1, figure 14, examples and Table 3) discloses cubic boron nitride which contains 0.1 to 0.7 wt% magnesium, which if recalculated in terms of moles falls within the ranges defined in claims 1-3 of the current application. Moreover, at least specimen no. 2 in Table 3 appears to have a mean particle size of less than 10  $\mu\text{m}$ . Thus, document D1 appears to be prejudicial to the novelty of claims 1-4 and 18.

4.2 Document D2 (claim 1, examples) appears to disclose cubic boron nitride containing 0.05 wt.% Mg. Document D2 appears to be prejudicial to the novelty of claims 1-4, 17 and 18.

**Section VI (other documents)**

5. The following document(s) could be of relevance in a subsequent European phase:

D3: WO 2004/069399 A (SHOWA DENKO K.K; OTSUBO, HIROHIKO; IHARA, EIJI; TSUJI, KATSUYUKI) 19 August 2004 (2004-08-19) and US2004/0265203, used as a translation of WO2004/069399.

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